

JAVELIN

Most athletes can throw a javelin with reasonable success. However, correctly executing mechanical principles with forces required for long throws makes javelin throwing one of the most difficult events in track and field. The javelin thrower must coordinate flexibility, speed, power, and agility to maximize throwing distance. Forcefully loading the body's lever system requires tremendous confidence and proper timing. The positions and stresses encountered can easily cause injury when not effectively coordinated.

It should be noted that the term *throw* does not adequately describe delivery of the javelin. Terms like *fling*, *sling*, and *whip* are much more descriptive and imply a more relaxed, sequentially efficient delivery in which the arm becomes involved only after the major muscles of the legs, hips, and trunk are utilized. Throwing the javelin is analogous to cracking a whip. The handle or grip is accelerated, then abruptly stopped, transferring momentum throughout its length to the tip. A higher handle velocity (assuming it is still stopped abruptly) produces greater tip speed and a louder "crack". During javelin delivery the athlete's lower leg and foot represent the handle of the whip and the hand holding the javelin represents the tip. Greater approach velocity, when properly terminated at the plant, increases release velocity. Each thrower must determine their maximum controllable speed of approach. Exceeding this speed results in poor delivery position, inefficient transfer of force and reduced release velocity. The speed a thrower is able to utilize effectively varies among athletes but usually increases as technique, strength, and confidence improve.

For the purpose of discussion, the throw will be described in its component parts. Both coach and athlete should understand that each of these segments is part of a continuum. The success of each segment is dependent upon the successful execution of the preceding segment(s). All explanations are for a right-handed thrower.

GRIP

The javelin is held with the grip lying in the long groove of the palm which extends from the index finger to the middle of the wrist. Touching the thumb and the little finger together determines the location of this groove. It is important to grasp the javelin firmly, but not squeeze too tightly. Some form of adhesive is often used on the fingers to enhance the grip, however, athletes should consult the rules of their governing association to determine whether this is permissible. The three most common styles of holding the javelin are listed below.



Grip #1 - The thumb and middle finger are set against the back of the grip with the index finger extended toward the back and slightly around the outside of the shaft. The remainder of the fingers wrap comfortably around the grip. (Fig. 1)

Fig. 1



Grip #2 - Similar to grip #1 except the thumb and index finger contact the back of the grip. (Fig. 2)

Fig. 2



Grip #3 - Commonly referred to as the fork grip, the index and middle finger contact the back of the grip with the thumb and remaining fingers wrapped around the shaft. (Fig. 3)

Fig. 3

It is important that the athlete be comfortable and confident with the grip so the javelin is controlled easily and force is not lost through slippage or eccentric (off center) thrust during delivery.

Points of Emphasis

1. Hold the javelin firmly. Squeezing too tightly will prematurely tighten the muscles of the throwing arm.
2. Keep the palm rolled upward. Allowing the palm to turn outward (thumb side up) often results in side arm throws and injury.

APPROACH

The run up must be consistent and provide the thrower with maximum controllable speed. The javelin is carried with the upper arm parallel to the ground and the elbow flexed to approximately 90 degrees (Fig. 4). Except for the use of the throwing arm, normal running mechanics are used during preliminary acceleration (run prior to drawback). The thrower may elect to start from a stationary position or walk/slow jog into the approach. The number of strides (usually 10-16) will vary depending on technical proficiency, strength and confidence. A longer run often represents greater approach velocity. Starting slowly with a short, controlled run up is advisable for the novice. Beginning with a long approach and/or excessive speed often results in a loss of confidence and poor throwing mechanics. Avoid extraneous movement of the javelin during the approach as vigorously pumping the javelin back and forth or up and down will only result in loss of control. The javelin remains approximately parallel to the ground during preliminary acceleration. A marker should be placed adjacent to the runway where the approach is to begin and starting each effort from this point will help create consistency. Keep the body upright and do not lean too far forward. Over displacement of the body's mass produces poor running mechanics, uncontrolled speed, and is difficult to correct before delivery.

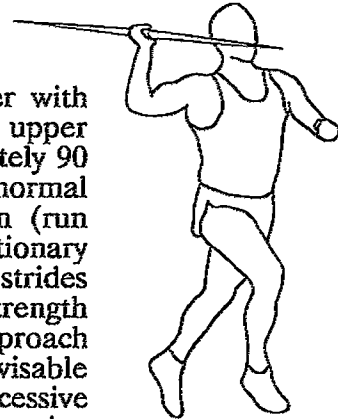


Fig. 4

Points of Emphasis

1. **Be Consistent!** Adjustments in the approach invariably lead to reduced performance.
2. Do not incorporate more speed than can be effectively utilized at delivery.
3. A passive, rhythmic movement of the throwing arm during preliminary acceleration is permissible.
4. Always maintain control of the javelin. Excessive movement creates an unpredictable delivery.
5. Establish and maintain an upright posture. Avoid bending at the waist or leaning too far forward.

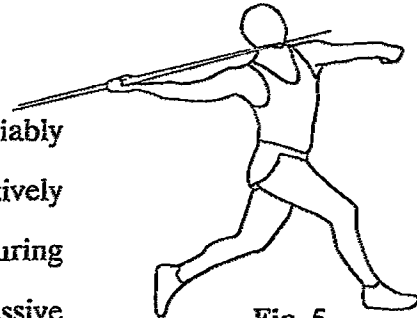


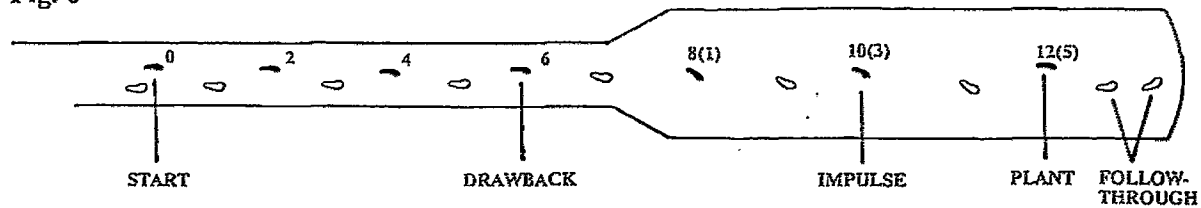
Fig. 5

DRAWBACK

Following preliminary acceleration of the run up (usually 4-10 strides), the javelin is drawn back in preparation for delivery. The throwing arm is extended backward while the trunk rotates clockwise aligning the shoulder plane and javelin with the throwing direction (parallel) (Fig. 5). This movement is initiated as the left foot contacts the ground. The drawback is normally completed in one or two strides and should be executed smoothly

EXAMPLE OF A 12 STRIDE APPROACH

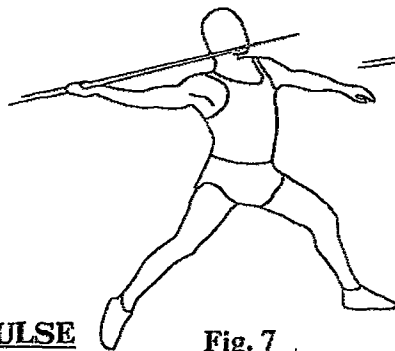
Fig. 6



without loss of javelin control. Once the javelin is withdrawn, most throwers take five final preparatory strides before delivery. (NOTE: Left foot contact following initiation of the drawback represents the first of these five strides (Fig. 6). Continue looking in the throwing direction (chin toward left shoulder) and avoid dropping the head toward the javelin shaft or looking at the tip. *Run through the hips* while keeping the trunk upright and the javelin as far back as possible. Do not bend at the waist or lean excessively forward. The throwing arm is relaxed and fully extended as a flexed elbow results in a shorter throwing lever and decreased release velocity.

Points of Emphasis

1. Drawback is smooth, continuous, and performed during one or two strides.
2. Foot placement for the remainder of the run-up is angled approximately 45° to the right (Fig. 6).
3. Following drawback, the throwing hand is approximately shoulder height with the javelin tip located between the eye and chin.
4. Keep the wrist of the throwing arm straight. Bending the wrist makes javelin control difficult.



IMPULSE

Fig. 7

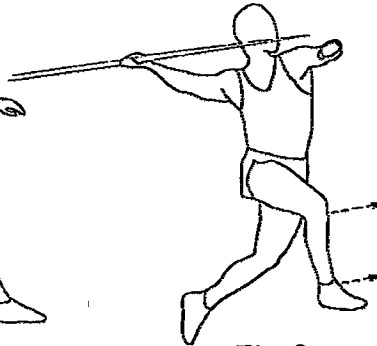


Fig. 8

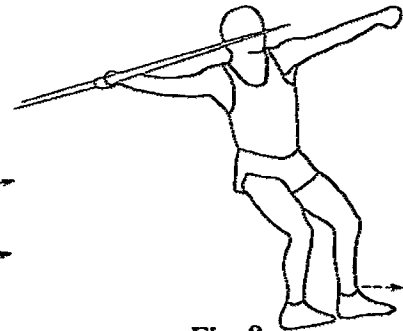


Fig. 9

The penultimate stride is the most active of the run up. In preparation, the leg is extended more completely in front of the body (slightly longer stride) (Fig. 7) and performs an active pull coordinated with a quick forward thrust of the right knee and lower leg (Fig. 8). Left foot contact is on the ball of the foot. Contacting the heel is not as quick or active and results in a *heavier* movement. Keep the swing (right) leg bent at the knee with the lower leg approximately perpendicular to the ground. A properly coordinated impulse (penultimate) stride generates velocity and extends time in the air, allowing the feet and legs to reposition (left foot in front) for delivery **PRIOR** to touch down (Fig. 9).

Points of Emphasis

1. Left foot placement at impulse is extended further forward and pulls back toward the body.

2. Ground contact with the left foot is active and quick. Maintaining extended ground contact (behind the body) shifts the body plane and center of mass forward and delays left leg recovery.
3. Project the body horizontally. Excessive height (vertical force) results in a heavy landing, reduced velocity, and poor delivery mechanics.
4. Lower body movements are quick and forceful while the upper body remains upright, relaxed and extended (Fig. 7, 8, 9).

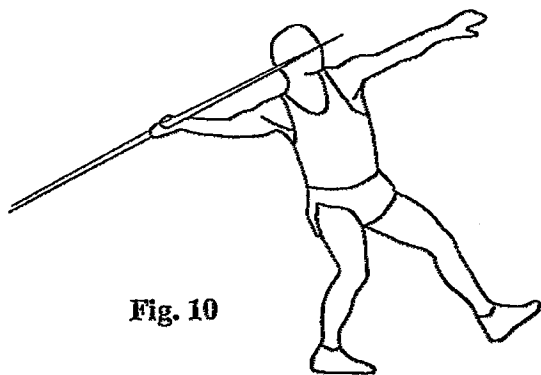


Fig. 10

DELIVERY

Javelin delivery is the product of: 1) checking the body's linear momentum and, 2) rotation around the body's vertical axis. The throwing arm is actively utilized **only** at the very end of the delivery motion. As the thrower lands on the right foot, the left arm is extended in the throwing direction (Fig. 10). Ground contact is made on the right heel with as little resistance as possible. Body weight is quickly transferred over and beyond the foot as horizontal movement continues unrestricted.

During the final stride the hips begin to rotate in the direction of the throw (counter clock-wise). This is followed closely by shoulder plane rotation in the same direction as the left arm is flexed and forcefully drawn back to the body. At this point, the throwing arm is still relaxed and not actively involved (Fig. 11). Left foot contact (plant) serves as a break, transferring momentum from the run up through the body to the javelin. It is essential that the left (post) leg remain rigid to maximize momentum transfer.

As these rotations near completion and the throwing arm has been effectively "collapsed" (a natural result of body rotations and a relaxed arm) (Fig. 11), muscles of the arm and shoulder are contracted to complete delivery. Delivery movements are performed in a definite sequence, however, they appear to be practically simultaneous.

Points of Emphasis

1. Keep the left thumb pointed downward prior to left arm flexion. This helps prevent the shoulders from opening prematurely (Fig. 10).
2. Do not flex forward at the waist. Emphasis must be on lower and upper body rotation.
3. Roll through the right leg. Keep the leg bent and avoid breaking or restrictive movements.
4. Plant the left leg horizontally, not vertically. Foot pressure should be predominantly toward the front of the shoe, **NOT DOWNWARD** (Fig. 11).
5. The left arm is drawn back toward the body to accelerate shoulder plane rotation. Wide circular motions are too slow and result in poor throwing position and reduced velocity.
6. Pull through the point (center of mass). Javelin control and a relaxed throwing arm assist in this effort. Eccentric (off center) thrust produces poor flight characteristics and reduced performance.
7. Keep the delivery angle low (29-33 degrees).
8. Plant the left foot at least two meters behind the foul line to allow adequate follow-through.

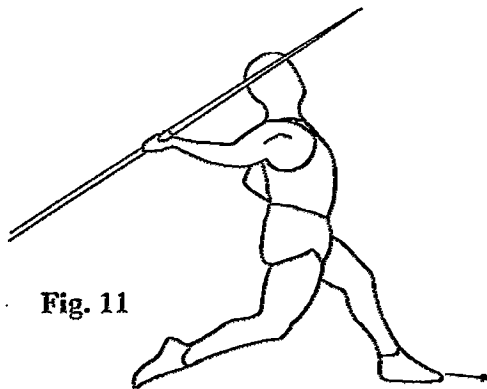


Fig. 11

FOLLOW-THROUGH

The thrower's momentum will naturally carry them at least one more stride (to the right leg) with perhaps a final hop on that leg to establish balance and stop forward movement (Fig. 6). For this reason the final left foot of the approach (post leg) should be planted at least two meters behind the foul line. The distance gained by moving closer is far exceeded by the throwing distance lost through restricted delivery and poor follow-through.

Points of Emphasis

1. Do not watch the flight of the javelin until forward momentum is stopped and balance is attained.
2. Proper delivery mechanics produce a follow through directly aligned with the approach. Recovery steps to the right or left of center often indicate faulty mechanics or body alignment/balance problems in preceding phases.

In theory, throwing the javelin should be a natural, uninhibited series of movements. However, it is quickly realized that the positions and forces required for long throws require a high level of confidence and skill which is only attained through persistence and hard work. Remember, start slowly with beginners to develop confidence, correct technique, and avoid injuries.